

## WHAT IS CLAIMED IS:

1. A semiconductor light emitting device comprising:

a substrate;

an n-type layer provided on the substrate and made of a nitride semiconductor material;

a multiple quantum well structure active layer including a plurality of well layers each made of  $\text{In}_x\text{Ga}_{(1-x-y)}\text{Al}_y\text{N}$  ( $0 \leq x$ ,  $0 \leq y$ ,  $x+y < 1$ ) and a plurality of barrier layers each made of  $\text{In}_s\text{Ga}_{(1-s-t)}\text{Al}_t\text{N}$  ( $0 \leq s$ ,  $0 \leq t$ ,  $s+t < 1$ ), the multiple quantum well structure active layer being provided on the n-type layer; and

a p-type layer provided on the multiple quantum well structure active layer and made of a nitride semiconductor material,

wherein the p-type layer contains hydrogen, and the hydrogen concentration of the p-type layer is greater than or equal to about  $1 \times 10^{16}$  atoms/cm<sup>3</sup> and less than or equal to about  $1 \times 10^{19}$  atoms/cm<sup>3</sup>.

2. A semiconductor light emitting device according to claim 1, wherein the p-type layer contains Mg, and the Mg concentration of the p-type layer is greater than or equal to about  $4 \times 10^{19}$  atoms/cm<sup>3</sup> and less than or equal to

Sub 7  
A1

about  $1 \times 10^{21}$  atoms/cm<sup>3</sup>.  
X

Sub A, 7  
3. A semiconductor light emitting device according to claim 1, further comprising a p-type electrode for applying a voltage via the p-type layer to the multiple quantum well structure active layer, wherein the p-type electrode contains atoms selected from the group consisting of Pd, Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Tb, Ti, Zr, Hf, V, Nb and Ta.

4. A semiconductor light emitting device according to claim 2, further comprising a p-type electrode for applying a voltage via the p-type layer to the multiple quantum well structure active layer, wherein the p-type electrode contains atoms selected from the group consisting of Pd, Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Tb, Ti, Zr, Hf, V, Nb and Ta.

Sub A, 7  
5. A semiconductor light emitting device according to claim 1, the hydrogen concentration of the n-type layer is less than or equal to  $1 \times 10^{17}$  atoms/cm<sup>3</sup>.

6. A semiconductor light emitting device according to claim 4, the hydrogen concentration of the n-type layer

7. A semiconductor light emitting device according to claim 1, further comprising a layer including Al, wherein the p-type layer is provided, via the layer including Al, on the multiple quantum well structure active layer.

9. A method for producing a semiconductor light emitting device, the method comprising the steps of:

forming a multiple quantum well structure active layer including a plurality of well layers each made of  $\text{In}_x\text{Ga}_{(1-x-y)}\text{Al}_y\text{N}$  ( $0 \leq x$ ,  $0 \leq y$ ,  $x+y < 1$ ) and a plurality of barrier layers each made of  $\text{In}_s\text{Ga}_{(1-s-t)}\text{Al}_t\text{N}$  ( $0 \leq s$ ,  $0 \leq t$ ,  $s+t < 1$ ), the multiple quantum well structure active layer being provided on the n-type layer; and

growing a nitride semiconductor material on the multiple quantum well structure active layer to form a p-type layer,

wherein the step of growing the p-type layer includes the step of growing a nitride semiconductor material in an atmosphere not containing hydrogen gas while keeping a temperature of the substrate at a first growth temperature.

10. A method according to claim 9, wherein the step of forming the p-type layer further includes the step of lowering the temperature of the substrate from the first growth temperature to about 400°C in the atmosphere not containing hydrogen gas after the step of growing the nitride semiconductor material in the atmosphere not containing hydrogen gas.

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